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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,850	12/05/2001	Peggy J. Clews	SD6957S97604	7432
7590 07/23/2004 Sandia National Laboratories P. O. Box 5800 - MS-0161 Albuquerque, NM 87185-0161			EXAMINER TRAN, BINH X	
			ART UNIT 1765	PAPER NUMBER

DATE MAILED: 07/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/010,850

Applicant(s)

CLEWS ET AL.

Examiner

Binh X Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6-15-2004 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 1, 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akatsu et al. (US 6,281,084) in view of Smith et al. (US 6,479,395) and Agnello (US 5,897,349).

Akatsu discloses a method for etching a semiconductor device using a plurality of deposited and patterned layers of polysilicon (18), conductor layer (20) and glass material (38) (glass material read on "oxide sacrificial material") comprising the step of:

etching the glass material (38) by immersing the device using an etching solution comprising hydrofluoric acid (HF) and sulfuric acid (H_2SO_4) (Fig 3-4, col. 3 lines 31-40) while retaining the polysilicon layer (18) and conductor layer (20). Akatsu differs from the invention by the specific ratio between HF and H_2SO_4 .

In a method for etching glass material, Smith teaches to use a solution comprises hydrofluoric acid and a counter acid such as sulfuric acid (col. 7 lines 25-45). Smith further discloses the ratio between the hydrofluoric acid and counter acid (including sulfuric acid) is a result effective variable. In one specific example, Smith discloses the hydrofluoric acid amount ranges 25% to 1 % and counter acid amount ranges from 40% to 5 % (col. 7 lines 30-35). Since Smith clearly teaches the amount of hydrofluoric acid and counter acid (H_2SO_4) is variable, any person having ordinary skill in the art would be able to choose any specific amount of hydrofluoric acid and counter acid within Smith's suggested range to have the acid ratio the same as applicants' invention. For example, if one chooses 25 % of HF and 8.33 % of counter acid, the ratio of HF: H_2SO_4 (counter acid) would be 3:1. If 25% of HF and 25% of counter acid is used, the ratio of HF: H_2SO_4 (counter acid) is 1:1. Further, the result effective variable is commonly

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determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal ratio as an expected result.

Akatsu and Smith also fail to disclose the aluminum layer in the semiconductor device. However, Akatsu clearly discloses a gate conductor layer (20) presents in a semiconductor device. Agnello discloses a gate conductor (13) comprise aluminum material (col. 7 lines 63-65). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Akatsu and Smith in view of Agnello by using aluminum because equivalent and substitution of one for the other would produce an expected result.

Respect to claim 2, Akatsu teaches the gate conductor (20) was not etched during the step of removing the glass material (38) because it was not exposed to the etching solution (Fig 3-4). Since the gate conductor (20) was not etched, therefore the etch selectivity of glass material (i.e. sacrificial oxide) to the gate conductor is infinite (read on "greater than 100").

Respect to claim 5, Akatsu discloses that the semiconductor device is used for integrated circuit (read on micro-mechanical and/or micro-electrical-mechanical device). Respect to claim 6, Smith teaches to etch the glass material at -10 to 40 °C (col. 7 lines 35-40; within applicant's range of 5 - 70 °C). Respect to claim 7, both Akatsu and Smith discloses that HF and H_2SO_4 are used in semiconductor process (read on "semiconductor grade").

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5. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akatsu et al. (US 6,281,084) in view of Smith et al. (US 6,479,395) and Agnello (US 5,897,349) as applied to claim 1 above, and further in view of Liaw et al. (US 6,605,230).

Claims 8-9 differ from Akatsu, Smith and Agnello by the specific weight percent of HF or H₂SO₄. However, Akatsu and Smith clearly disclose the use of HF and H₂SO₄. Liaw teaches to use commercial available HF 49% and H₂SO₄ 96% (col. 2 lines 49-51, within applicants' range). It would have been obvious to one having ordinary skill in the art, at the time of invention, to use HF 49% and H₂SO₄ 96% because they are commercial available.

Response to Arguments

6. Applicant's arguments with respect to claims 1, 4-9 regarding to the new added limitation "while retaining the patterned layers of polysilicon and the metal layer including aluminum" have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G Norton can be reached on (571) 272-1465. The fax phone

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number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Binh X. Tran

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER

